the user interface output sequence], each of the operators having at least one precondition to be satisfied before the operator can be performed;

providing a compiler for compiling the specification which results in a user interface output controller distinct from the application program, the user interface output controller including [that includes] a plurality of plans, each of the plans having a series of operators, a start UIOS and one of the goal UIOSes, [a goal user interface output state, and a start user interface output state that identifies a current user interface output state of the user interface output sequence,] the series of operators for transforming the start UIOS (user interface output state) to at least one intermediate UIOS to the goal UIOS, the operators in the series such that the preconditions of a first operator in the series are satisfied by the start UIOS and such that the preconditions of each of the other operators in the series are satisfied after performance of earlier operators in the series; and [user interface output state;]

while the application program is running on the processing means,

providing the user interface output controller with an event received from the application program, the event identifying one of the goal UIOSes (user interface output states];

determining a currently displayed UIOS [the start user interface output state of the user interface output sequence];

retrieving one of the plurality of plans such that the start TAOS of the retrieved plan is the currently displayed UIOS and the goal UIOS of the retrieved plan is the goal UIOS identified by the event [based on the determined start user interface output state of the user interface output sequence and the identified one of the goal user interface output states]; and

performing the series of operators provided by the retrieved plan to display the start UIOS followed by the at least one intermediate UIOS followed by the goal UIOS [transform

the determined start user interface output state to the identified one of the goal user interface output states so as to display the series of operators on the display device].

20. (Amended) The method of claim 19 wherein the step of applying a planning methodology to generate each of the plans includes the steps of

selecting each of the plurality of goal UIOSes [user interface output states];

for each selected goal UIOS [of the goal user interface output states], selecting each of the plurality of operators [in a sequence,]:

performing an inverse of the selected operator [one of the operators] on the selected [one of the] goal UIOS [user interface output states]; and

when the operators [inverse of the selected one of the operators] transforms the selected [one of the] goal UIOS [user interface output states] into a new UIOS [user interface output state], storing the new UIOS [user interface output state] along with the selected operator [one of the operators which transforms the new user interface output state into the goal user interface output state].

21. (Amended) The method of claim 20 wherein the new [user interface output state] UIOS is identified as an intermediate UIOS and is then processed as a goal [user interface output state] UIOS.

22. (Amended) In a data processing system including a display device and a processing means running an application program, a method comprising the steps of:

providing a user interface output controller for generating a user interface output sequence, the user interface output controller distinct from the application program, the user interface output sequence including a first user interface output state and a second user interface output state, the first user interface output state and the second user interface output state each including a set of conditions representing values which capture attributes of that user interface output state; and

under the control of the user interface output controller,

receiving [providing] operators from the application program each operator having a precondition consisting of one of the conditions in the set and a required value for the condition such that the operator can only be performed when a current user interface output state satisfies the precondition by including the condition representing the required value [which identify actions which transform the first user interface output state into the second user interface output state];

after receiving the operators, receiving an event from the application program [at the user interface output controller, the event] specifying a goal to be achieved by the user interface output sequence;

upon receiving the event from the application program, determining [whether any of the] conditions which temporally precede the event;

[when there are conditions which precede the event,] establishing the determined conditions which precede the event;

performing [the provided] a plurality of the received operators to transform the first user interface output state into the second user interface output state, which establishes the event, the plurality such that a first operator of the plurality has a precondition which is satisfied

by a current user interface output state and wherein after the performance of each operator in the plurality resulting UTOS satisfies the precondition for the operator next in the plurality;

determining [whether any of the] conditions which temporally follow the event, and

[when there are conditions which follow the event,] establishing the determined conditions which follow the event.

26. (Amended) A data processing system, comprising:

a display device for displaying a sequence of a plurality of user interface output states (UIOSes) [sequence];

a processing means for running an application program;

means for providing a user interface output system for controlling the generation of the [user interface output] sequence;

means for providing a specification identifying goal UIOSes [user interface output states, which identify user interface output states] for the user interface output system to establish[,] and identifying a plurality of operators, each operator for transforming one UIOS into another UIOS such that a precondition of the operator is established by the one UIOS and such that a postcondition of the operator is established in another UIOS: [which specify actions to be performed by the user interface output sequence;]

means for compiling the specification to generate a user interface output controller distinct from the application program; and

means for storing the user interface output controller in memory, the user interface output controller including,

means for receiving an event from the application program, the event identifying one of the goal UIOSes [user interface output states;]

means for determining a current ULOS [user interface output state] in the [user interface output] sequence;

means for determining a series [sequence] of operators which transform the determined current UIOS [user interface output state] into the identified one of the goal [user interface output states;] and

means for performing the series [sequence] of operators to display the sequence on the display device, the performing to transform the determined current UIOS [user interface output state] into at least one intermediate ULOS and then into the identified one of the goal UIOSes. [user interface output states so as to display the sequence of operators on the display device.]

27. (Amended) The system of claim 26 wherein the received event identifies a timing specification which determines the time at which the series [sequence] of operators are performed.

28. (Amended) The system of claim 27 [26] further comprising means for incorporating the identified timing specification into the [user interface output] sequence.

29. (Amended) A user interface output system for controlling the generation of a user interface output sequence, comprising:

a specification for identifying goal user interface output states, which identify user interface output states for the user interface output system to establish[,] and for identifying operators which specify actions to be performed by the user interface output sequence each of the operators having at least one precondition to be satisfied before the operator can be executed;

a compiler for compiling the specification to generate a user interface output controller distinct from an application program; and

a storage for storing the user interface output controller in memory, the user interface output controller comprising,

a receiver for receiving an event from the [an] application program, the event identifying one of the goal user interface output states;

a first determinor for determining a current user interface output state in the user interface output sequence;

a second determinor for determining a sequence of operators which transform the determined current user interface output state into at least one intermediate user interface output state and then into the identified one of the goal user interface output states, the operators in the sequence such that after execution of each of the operators in the sequence other than a last operator, the preconditions of a next operator in the sequence are satisfied; and

an executor for executing the sequence of operators to transform the determined current user interface output state into the at least one intermediate user interface output state and then into the identified one of the goal user interface output states so as to display the sequence of operators on a display device.

32. (Amended) A computer-readable storage medium, upon which is stored [an application program and] a user interface output controller for generating a user interface output sequence, the user interface output controller distinct from an application program and performing the steps of:

receiving an event from the application program, the event specifying a goal to be achieved by the user interface output sequence by displaying a series of a plurality of user interface output states; and

upon receiving the event from the application program,

generating the user interface output sequence, wherein the user interface output sequence achieves] for achieving the goal user interface output sequence including a plurality of operators that if executed when a predefined set of conditions are true will display the plurality of user interface output states, the predefined set of conditions including at least one precondition of a first of the plurality of operators such that at least one precondition must be true before the first operator can be executed, the operators in the sequence ordered such that execution of previous operators in the sequence will establish as true conditions necessary for execution of a next operator in the sequence: [in response to the event]; and

executing the plurality of operators of the generated user interface output sequence when the predefined set of conditions is true so as to display the series of the plurality of user interface output states [generated user interface output sequence] on a display device.

Please also add claims 33-37 as follows:

33. In a data processing system including a display device and a processing means running an application program, the application program having a user interface with a current User Interface Output State (UIOS) displayed on the display device, a method comprising:

providing a user interface output controller for displaying the user interface, the user interface output controller distinct from the application program;

under control of the application program,

without knowledge of the current UIOS displayed on the display device, determining a goal UIOS to be displayed on the display device; and

sending to the user interface output controller an indication of the goal UIOS; and

under control of the user interface output controller,

receiving from the application program the indication of the goal UIOS;

determining the current UIOS;

determining a sequence of a plurality of operators based on the determined current UIOS and the goal UIOS; and

for each of the operators in sequence, performing the operator to transition the user interface from a current UIOS to a different resulting UIOS, the performing such that the resulting UIOS is displayed on the display device and becomes the current UTOS and such that the current UIOS after all the operators are performed is the goal UIOS, the sequence such that the preconditions for a first operator in the sequence are currently established and such that the preconditions for all other operators in the sequence are established after execution of earlier operators in the sequence,

whereby the application program specifies a goal UIOS without knowledge of the current UIOS, and in response the user interface output controller determines a sequence

of operators that when performed transition the user interface from the current UIOS through at least one displayed intermediate UIOS to the displayed goal UIOS.

34. The method of claim 33 wherein the determined sequence of the plurality of operators is generated after the receiving of the indication of the goal UIOS.

35. The method of claim 33 wherein each UIOS has a value for each of a plurality of UIOS variables, wherein each operator has a precondition of a UIOS variable and a required value for the UIOS variable, wherein an operator having a precondition of a first variable and a first value can only be performed when a current UIOS satisfies the operator precondition by having a value for the first variable that is equal to the first value, wherein the determined sequence begins with a first operator whose precondition is satisfied by the determined current UIOS, and wherein alter the performance of each operator in the determined sequence, the resulting UIOS satisfies the precondition for the operator next m the determined sequence.

36. The method of claim 35 wherein the determined sequence is generated by:

identifying a UIOS variable whose value in the goal UIOS is different than in the current UIOS;

selecting a last operator such that the resulting UIOS from performing the last operator has a value for the identified UIOS variable that is equal to the value for the identified UIOS variable in the goal UIOS;

selecting an initial operator such that the resulting UIOS from performing the initial operator satisfies the precondition of the last operator;

until the current UIOS satisfies the precondition of the initial operator, repeatedly performing the steps of

designating the initial operator to be an intermediary operator; and

selecting an initial operator such that the resulting UIOS from performing the initial operator satisfies the precondition of the operator most recently designated to be an intermediary operator;

determining the plurality of operators to be the selected operators; and

determining the sequence of the plurality of operators to be a reverse of the selection order.

37. A method for displaying user interface information for a plurality of application programs, each application program having a distinct user interface and an operator set consisting of a plurality of operators, each operator having at least one precondition which must be established before the operator can be performed, the method comprising:

providing a user interface output controller distinct from the application programs; and

under control of the user interface output controller and for each of the application programs,

receiving from the application program the operator set for the application program;

after receiving the operator set, receiving from the application program a plurality of user interface goals, each user interface goal reflecting information to be displayed in the user interface for the application program; and

for each user interface goal, achieving the user interface goal by

determining the information currently displayed in the user interface for the application program;